

IN THE CLAIMS:

Please amend the claims as follows:

Claims 1-6 (cancelled)

Cancel claims 7 and 8 without prejudice.

---

Claim 9 (currently amended): An inverted microscope comprising:

an objective lens for magnifying an image of a sample, disposed below the sample;

D, a first light source for emitting excitation light to illuminate the ~~the~~ [[a]] sample via said objective lens;

a second light source for emitting a laser beam to illuminate the sample via said objective lens;

an image-forming lens for said laser beam for focusing said laser beam on the sample via said objective lens;

a lens holder for supporting said image-forming lens for said laser beam, the lens holder ~~enables~~ enabling said image-forming lens for said laser beam to move in a direction of an optical axis of said laser beam for adjusting a position of said image-forming lens for said laser beam so that said laser beam is focused on an appropriate position for said objective lens;

a first optical element for directing light from the sample to an imaging port;

a second ~~first~~ optical element ~~disposed in an observation optical path along the optical axis of said objective lens,~~ for directing said excitation light from the first light source to the sample, ~~and for transmitting observation light from the sample;~~

a third ~~second~~ optical element ~~disposed in said observation optical path behind said first optical element,~~ for directing said laser beam from said second light source to the sample, ~~and for transmitting said observation light from the sample;~~

~~a third optical element for directing light passed through the second optical element to an imaging optical path;~~

a moving mechanism in which said first ~~second~~ optical element and third optical element are mounted, for removing said first ~~second~~ optical element and said third optical element from an ~~said~~ observation optical path at the same time; and wherein

the image-forming lens for said laser beam is disposed between said second light source and said third ~~second~~ optical element.

Claim 10 (cancelled)

Claim 11 (currently amended): An inverted microscope comprising:

- an objective lens for magnifying an image of a sample, disposed below the sample;
- a first light source for emitting excitation light to illuminate a sample via said objective lens;
- a second light source for emitting a laser beam to illuminate the sample via said objective lens;
- an image-forming lens for said laser beam for focusing said laser beam on the sample via said objective lens;
- a lens holder for supporting said image-forming lens for said laser beam, the lens holder enabling said image-forming lens for said laser beam to move in a direction of an optical axis of said laser beam for adjusting a position of said image-forming lens for said laser beam so that said laser beam is focused on an appropriate position for said objective lens;
- a first optical element for directing light from the sample to an imaging port;
- a second optical element for directing said excitation light from the first light source to the sample;
- a third optical element for directing said laser beam from said second light source to the sample;
- a moving mechanism in which said first optical element and third optical element are mounted, for removing said first optical element and said third optical element from an observation optical path at the same time; and wherein

~~The inverted microscope according to claim 9, wherein~~

said first ~~third~~ optical element comprises a total reflection prism,

said moving mechanism further holds ~~said third optical element~~ and a total transmission prism for directing light from the sample to an ocular lens ~~with said second optical element~~, and selectively inserts ~~switches~~ said first ~~third~~ optical element and said total transmission prism in said observation optical path through a movement of said moving mechanism, ~~light of the observation optical path is directed to a lens barrel through a reflection on a reflection element after passing through the total transmission prism, and~~

in said moving mechanism, the distance Y which is the distance between said total reflection prism and said total transmission prism is set to be longer than a half of the diameter X which is the maximum diameter of a light flux of said observation optical path.

Claim 12 (currently amended): An inverted microscope comprising:

an objective lens disposed below a sample;

a[[n]] first image-forming lens for focusing observation light from said objective lens, said first image-forming lens imaging said observation light at a focal plane;

a reflecting mirror for directing transmitted light passing through said first image-forming lens to a front side of the microscope;

a first optical element disposed between said first image-forming lens and said reflecting mirror, for directing light from said first image-forming lens to the backside of the microscope to form an imaging optical path, which backside is the opposite side of the front side of the microscope on which a ~~said~~ lens-barrel is disposed;

a port in said microscope, said imaging optical path passing through said port;

an imaging device coupled to said port, said imaging device having an image plane substantially corresponding to the focal plane of the first image-forming lens;

a first light source, located on said backside, for emitting excitation light to illuminate the sample via said objective lens;

a second optical element disposed in an observation optical path along the optical axis of said objective lens, for directing said excitation light from the first light source to the sample, and for transmitting observation light from the sample;

a second light source for emitting a laser beam incident on the sample via said objective lens;

a third optical element disposed in said observation optical path ~~behind said first optical element~~, for directing said laser beam from said second light source to the sample, and for transmitting said observation light from the sample and directing said observation light to said first optical element; and

a[[n]] second image-forming lens for said laser beam disposed between said second light source and said third ~~second~~ optical element, for focusing said laser beam on the sample.

Claim 13 (currently amended): The inverted microscope according to claim 12, and further including a lens holder for supporting said second image-forming lens for said laser beam to enable movement of said second image-forming lens for said laser beam in a direction of an optical axis of said laser beam, said lens holder adjusting a position of said second image-

forming lens for said laser beam so that said laser beam is focused on an appropriate position for said objective lens.

Claim 14 (currently amended): The ~~An~~ inverted microscope according to claim 12 and further including:

a first reflected illuminator coupled to the first light source, for directing light from the first light source;

a relay tube coupled to the first reflected illuminator, having a mirror inside for deflecting light emitted from the first light source and passed through the first reflected illuminator; and

a second reflected illuminator coupled to the relay tube for directing the light deflected on the mirror in the relay tube to inside of the microscope.

b, Claim 15 (currently amended): The ~~An~~ inverted microscope according to claim 12 wherein and further including:

~~a lens barrel disposed on the front said of the microscope; and~~

the ~~[[a]]~~ reflecting mirror directs ~~for directing~~ the transmitted light ~~passing through said first image-forming lens~~ to the lens-barrel on the front side of the microscope.

Claim 16 (currently amended): The ~~An~~ inverted microscope according to claim 12 wherein said second optical element comprises a fluorescent cube disposed between the objective lens and the first image-forming lens, for directing the excitation light from the first light source ~~passed through the second reflected illuminator~~ to the objective lens ~~from the back side of the microscope.~~

Cancel claims 17-27 without prejudice.

Claims 17-27 (cancelled)

Claim 28 (currently amended): An microscope comprising:

an objective lens;

an ocular lens provided in an observation optical path of the objective lens;

a laser for emitting a laser beam;  
a first optical component element for directing the laser beam toward a sample along the observation optical path;  
a second optical component element for directing the light reflected from the sample away from the optical observation path in a direction other than the ocular lens so that the light reflected from the sample does not directed to the ocular lens at all; and  
a moving frame mechanism on which the first optical component element and second optical component element are provided, the moving frame mechanism places the first optical component element and second optical component element ~~[[()]]~~ in the observation optical path at the same time and removes the first optical component element and second optical component element from the observation optical path at the same time through the movement of the moving frame mechanism.

Claim 29 (currently amended): The microscope according to claim 28, wherein the first optical component element includes a dichroic mirror.

Claim 30 (currently amended): The microscope according to claim 28, wherein the second optical component element includes a reflector mirror.

b ,  
Claim 31 (currently amended): The microscope according to claim 28, wherein the reflected light deviated from the observing optical path by the second optical component element is directed to a port for mounting an imaging device.

Claim 32 (previously presented): The microscope according to claim 28, wherein the microscope is an inverted type.

Claim 33 (currently amended): A microscope comprising:

an objective lens;  
an ocular lens provided in an observation optical path of the objective lens;  
a first prism optical element for directing light reflected from a sample away from the observation optical observation path in a direction other than the ocular lens so that the light reflected from the sample is not directed to the ocular lens at all;

a second ~~prism optical element~~ for directing light reflected from the sample along the observation optical path towards the ocular lens; and

a moving ~~frame mechanism~~ on which the first ~~prism optical element~~ and the second ~~prism optical element~~ are provided, the moving ~~frame mechanism~~ exclusively places ~~placing~~ either the first ~~prism optical element~~ or second ~~prism optical element~~ in the observation optical path at ~~any one time~~.

Claim 34 (currently amended): The microscope according to claim 33, wherein

one of the first prism and second prism is a total reflection prism and the other prism is a total transmission prism, and

in the moving frame, the distance Y which is the distance between said total reflection prism and said total transmission prism is set to be longer than a half of the diameter X which is the maximum diameter of a light flux of said observation optical path ~~the first optical element and second optical element are separated by more than half of the diameter of the observation light bundle.~~

Claim 35 (currently amended): The microscope according to claim 33, further comprising:

a laser for emitting a laser beam;

an ~~third~~ optical element for directing the laser beam toward the sample along the observation optical path, wherein

the ~~third~~ optical element is also provided on the moving ~~frame mechanism~~, the moving ~~frame mechanism~~ places ~~placing~~ the ~~third~~ optical element and first ~~prism optical element~~ in the observation optical path at the same time and ~~removes~~ removing the ~~third~~ optical element and first ~~prism optical element~~ from the observation optical path at the same time through the movement of the moving ~~frame mechanism~~.

Claim 36 (currently amended): An inverted microscope comprising:

a sample stage for placing a sample;

an objective lens disposed below the sample stage;

a laser ~~second~~ light source for emitting a laser beam incident on the sample stage via said objective lens;

51 an optical element disposed in the said observation optical path of the microscope ~~behind said first optical element~~, for directing said laser beam from said laser second light source to the sample stage, ~~and for transmitting said observation light from the sample and directing said observation light to said first optical element~~; and

an image-forming lens for said laser beam disposed between said laser second light source and said ~~second~~ optical element, for focusing said laser beam on the sample.

---

Claim 37 (new): An inverted microscope comprising:

an objective lens disposed below a sample;

an image-forming lens for focusing observation light from said objective lens, said image-forming lens imaging said observation light at a focal plane;

a reflecting mirror for directing transmitted light passing through said image-forming lens to a front side of the microscope;

a first optical element for directing light from said image-forming lens to an imaging optical path extending to a backside of the microscope, said first optical element disposed between said image-forming lens and said reflecting mirror;

a port in said microscope, said imaging optical path passing through said port;

an imaging device coupled to said port, said imaging device having an image plane, said image plane substantially corresponding to said focal plane;

a first light source for emitting excitation light to illuminate the sample via said objective lens;

02 a second optical element for directing said excitation light to the sample and transmitting observation light from the sample, said second optical element disposed in an observation optical path along an optical axis of said objective lens;

a second light source for emitting a laser beam incident on the sample via said objective lens;

a third optical element for directing said laser beam from said second light source to the sample, transmitting said observation light from the sample and directing said observation light to said first optical element, said third optical element disposed in said observation optical path where said observation light has been transmitted through said second optical element;

an image-forming lens for said laser beam for focusing said laser beam on the sample, said image-forming lens for said laser beam disposed between said second light source and said third optical element; and

a lens holder for supporting said image-forming lens for said laser beam to enable movement of said image-forming lens for said laser beam in a direction of an optical axis of said laser beam, said lens holder adjusting a position of said image-forming lens for said laser beam so that said laser beam is focused on an appropriate position for said objective lens.

Claim 38 (new): The inverted microscope according to claim 37, further comprising:

a moving mechanism for removing said first optical element and said third optical element from said observation optical path at the same time.

Claim 39 (new): The inverted microscope according to claim 38, further comprising:

a total transmission prism; and wherein:

said first optical element comprises a total reflection prism, said total transmission prism being switched with said total reflection prism by using said moving mechanism, and being disposed in said observation optical when said third optical element and said total reflection prism are removed from said observation optical path, said moving mechanism holding said total reflection prism and said total transmission prism side by side in a direction that said moving mechanism moves, and a distance between said total reflection prism and said total transmission prism being longer than a half of a maximum diameter of said observation light.

Claim 40 (new): A microscope comprising:

an objective lens;

a first light source for emitting excitation light to illuminate a sample via said objective lens;

a second light source for emitting a laser beam to illuminate the sample via said objective lens;

an image-forming lens for said laser beam for focusing said laser beam on the sample via said objective lens;

a lens holder for supporting said image-forming lens for said laser beam to enable moving said image-forming lens for said laser beam in a direction of an optical axis of said laser



beam, said lens holder adjusting a position of said image-forming lens for said laser beam so that said laser beam is focused on an appropriate position for said objective lens;

a second optical element for directing said excitation light to the sample and transmitting observation light from the sample, said second optical element disposed in an observation optical path along an optical axis of said objective lens;

a third optical element for directing said laser beam from said second light source to the sample and transmitting said observation light from the sample, and said third optical element disposed in said observation optical path after said observation light has been transmitted through said second optical element;

a first optical element for directing said observation light transmitted through said third optical element to an imaging optical path by directing it to a port, said port placed in a position which said observation light passes through; and

a moving mechanism for removing said third and first optical elements from said observation optical path at the same time, wherein said objective lens is disposed below said sample, and said image-forming lens for said laser beam is disposed between said second light source and said third optical element.

02  
Claim 41 (new): The inverted microscope according to claim 37, wherein

the second optical element includes a fluorescent cube and the third optical element includes a dichroic mirror.

Claim 42 (new): The inverted microscope according to claim 37, further comprising:

an ocular lens disposed in the observation optical path after passing the reflecting mirror.

Claim 43 (New): The inverted microscope according to claim 11, wherein

the second optical element includes a fluorescent cube and the third optical element includes a dichroic mirror.

Claim 44 (New): An inverted microscope comprising:

an objective lens disposed below a sample;

a first image-forming lens for focusing observation light from said objective lens, said first image-forming lens imaging said observation light at a focal plane;

a reflecting mirror for directing transmitted light passing through said first image-forming lens to a front side of the microscope;

a first optical element disposed between said first image-forming lens and said reflecting mirror, for directing light from said first image-forming lens to the backside of the microscope to form an imaging optical path, which backside is the opposite side of the front side of the microscope on which a lens-barrel is disposed;

a port in said microscope, said imaging optical path passing through said port;

an imaging device coupled to said port, said imaging device being for taking an image that is, at least originally, formed by the first image-forming lens;

a first light source, located on said backside, for emitting excitation light to illuminate the sample via said objective lens;

a second optical element disposed in an observation optical path along the optical axis of said objective lens, for directing said excitation light from the first light source to the sample, and for transmitting observation light from the sample;

a second light source for emitting a laser beam incident on the sample via said objective lens;

a third optical element disposed in said observation optical path, for directing said laser beam from said second light source to the sample, and for transmitting said observation light from the sample and directing said observation light to said first optical element; and

an second image-forming lens for said laser beam disposed between said second light source and said third optical element, for focusing said laser beam on the sample;

a moving mechanism in which said first optical element and said third optical element are disposed, for removing said first optical element and said third optical element from said observation optical path at the same time, wherein:

said first optical element comprises a total reflection prism,

said moving mechanism further holds a total transmission prism for transmitting light from said image forming lens to the reflecting mirror, and selectively inserts said first optical element or said total transmission prism into the observation optical path through a movement of said moving mechanism, and

in said moving mechanism, the distance Y which is the distance between said total reflection prism and said total transmission prism is set to be longer than a half of the diameter X which is the maximum diameter of a light flux of said observation optical path.

Claim 45 (new): An inverted microscope comprising:

- an objective lens disposed below a sample;
- a first image-forming lens for focusing observation light from said objective lens, said first image-forming lens imaging said observation light at a focal plane;
- a reflecting mirror for directing transmitted light passing through said first image-forming lens to a lens barrel and an ocular lens;
- a first optical element disposed between said first image-forming lens and said reflecting mirror, for directing light from said first image-forming lens to an imaging optical path, the first optical element including an total reflection prism;
- a port in said microscope, said imaging optical path passing through said port;
- an imaging device coupled to said port, said imaging device having an image plane substantially corresponding to the focal plane of the first image-forming lens;
- a first light source, for emitting excitation light to illuminate the sample via said objective lens;
- a second optical element disposed in an observation optical path along the optical axis of said objective lens, for directing said excitation light from the first light source to the sample, and for transmitting observation light from the sample;
- a second light source for emitting a laser beam incident on the sample via said objective lens;
- a third optical element disposed in said observation optical path, for directing said laser beam from said second light source to the sample, and for transmitting said observation light from the sample and directing said observation light to said first optical element;
- a second image-forming lens for said laser beam disposed between said second light source and said third optical element, for focusing said laser beam on the sample;
- a lens holder for holding the second image-forming lens for said laser beam, the lens holder moving along the optical axis of the laser beam to adjust the position of the second image-forming lens so that the laser beam is focused on an appropriate position for the objective lens;
- and

a moving mechanism on which the first optical element and the third optical element are disposed, the moving mechanism removing the first optical element and third optical element from the observation optical path at the same time, wherein

the moving mechanism changes its status so that the light from the first light source and the laser beam from the second light source are directed to the imaging device when the second light source is used, and the light from the first light source is directed to the ocular lens when the second light source is not used.

Claim 46 (new): The inverted microscope according to claim 45, wherein

the moving mechanism further comprising a total transmission prism, the moving mechanism inserts the total reflection prism and the third optical element into the observation optical path when the second light source is used, and the moving mechanism inserts the total transmission prism into the observation path.

Claim 47 (new): The inverted microscope according to claim 46, wherein

in the moving mechanism, the distance Y which is the distance between the total reflection prism and the total transmission prism is set to be longer than a half of the diameter X which is the maximum diameter of the light flux of the observation light path.

Claim 48 (new): The inverted microscope according to claim 45, wherein

the light rays between the objective lens and the first image-forming lens are parallel.

Claim 49 (new): The inverted microscope according to claim 45, wherein the first light source is a fluorescent light source and includes a xenon lamp.

Claim 50 (new): The inverted microscope according to claim 45, wherein the first light source is a fluorescent light source and includes a mercury lamp.

Claim 51 (new): The inverted microscope according to claim 45, wherein the second optical element includes a fluorescent cube having a dichroic mirror and an excitation filter.

Claim 52 (new): The inverted microscope according to claim 45, wherein the second light source is a laser light source.

Claim 53 (new): The inverted microscope according to claim 45, wherein the third optical element includes a dichroic mirror.

Claim 54 (new): The inverted microscope according to claim 46, further comprising  
an absorption filter provided between the third optical element and the first image forming lens.

02 Claim 55 (new): The inverted microscope according to claim 45, wherein the imaging device is mounted on the back side of the microscope defining that the ocular lens mounted side of the microscope is the front side, and the first light source is provided on the microscope in the space above the imaging device and a light path of the first light source is deflected laterally by a mirror.

Claim 56 (new): The inverted microscope according to claim 45, further comprising  
a relay lens provided between the lens barrel and a reflection mirror for deflecting light from the sample to the lens barrel.

---